

CLAIMS

What is claimed is:

- 1 1. A method comprising:
 - 2 storing data of a first data transfer rate in a synchronous storage device having a
 - 3 first storage area;
 - 4 transmitting the data of the first data transfer rate to an asynchronous storage
 - 5 device;
 - 6 storing the data of the first data transfer rate in the asynchronous storage device
 - 7 having a second storage area, wherein the first storage area is larger than the second
 - 8 storage area; and
 - 9 outputting the data of the first data transfer rate from the asynchronous storage
 - 10 device at a second data transfer rate.
- 1 2. The method of claim 1, wherein the synchronous storage device is a
- 2 synchronous first-in-first-out register array.
- 1 3. The method of claim 1, wherein the asynchronous storage device is an
- 2 asynchronous first-in-first-out register array.
- 1 4. The method of claim 1, wherein the first data transfer rate is greater than the
- 2 second data transfer rate.
- 1 5. An apparatus comprising:
 - 2 a synchronous storage device to store data received at a first data transfer rate;
 - 3 an asynchronous storage device coupled to the synchronous storage device,; and
 - 4 control circuitry coupled to the synchronous storage device and to the
 - 5 asynchronous storage device, wherein the control circuitry is to transmit the data at the

6 first data transfer rate from the synchronous storage device to the asynchronous storage
7 device and wherein the control circuitry is to output the data from the asynchronous
8 storage device at a second data transfer rate.

1 6. The apparatus of claim 5, wherein the synchronous storage device is a
2 synchronous first-in-first-out register array.

1 7. The apparatus of claim 5, wherein the asynchronous storage device is an
2 asynchronous first-in-first-out register array.

1 8. The apparatus of claim 5, wherein the first data transfer rate is greater than the
2 second data transfer rate.

1 9. The apparatus of claim 5, wherein a storage area of the synchronous storage
2 device is larger than a storage area of the asynchronous storage device.

1 10. A method comprising:
2 receiving data at a first data transfer rate;
3 storing the data at the first data transfer rate in a synchronous storage device
4 having a first storage area;
5 processing the data at the first data transfer rate stored in the synchronous
6 storage device, wherein the processing includes:
7 removing the data from the synchronous storage device;
8 storing the data at the first data transfer rate in an asynchronous storage
9 device having a second storage area;
10 transmitting the data out from the asynchronous storage device at a
11 second data transfer rate, wherein the first storage area of the first storage device is
12 larger than the second storage area of the asynchronous storage device.

1 11. The method of claim 10, wherein the data of the first data transfer rate is
2 included in a signal using the Synchronous Optical Network (SONET) standard.

1 12. The method of claim 10, wherein the data at the second data transfer rate is
2 included in a signal using the Data Signal (DS)-3 standard.

1 13. The method of claim 10, wherein the synchronous storage device includes a
2 synchronous first-in-first-out register array.

1 14. The method of claim 10, wherein the asynchronous storage device includes an
2 asynchronous first-in-first-out register array.

1 15. The method of claim 10, wherein the first data transfer rate is faster than the
2 second data transfer rate.

1 16. An apparatus comprising:
2 a synchronous storage device having a first storage area and coupled to receive
3 data at a first data transfer rate;
4 an asynchronous storage device having a second storage area and coupled to the
5 synchronous storage device, wherein the first storage area is larger than the second
6 storage area; and
7 control circuitry coupled to the synchronous storage device and the
8 asynchronous storage device, wherein the control circuitry is to transfer the data at the
9 first data transfer rate from the synchronous storage device to the asynchronous storage
10 device when the second storage area is not full and wherein the control circuitry is to
11 output the data from the asynchronous storage device at a second data transfer rate.

1 17. The apparatus of claim 16, wherein the data of the first data transfer rate is part
2 of a signal using the Synchronous Optical Network (SONET) standard.

1 18. The apparatus of claim 16, wherein the data at the second data transfer rate is
2 part of a signal using the Data Signal (DS)-3 standard.

1 19. The apparatus of claim 16, wherein the synchronous storage device includes a
2 synchronous first-in-first-out register array.

1 20. The apparatus of claim 16, wherein the asynchronous storage device includes an
2 asynchronous first-in-first-out register array.

1 21. The apparatus of claim 16, wherein the first data transfer rate is faster than the
2 second data transfer rate.

1 22. A method comprising:
2 receiving data based on a Data Signal (DS)-3 standard from a payload of
3 Synchronous Optical Network (SONET) frames, wherein the SONET frames are being
4 transmitted on an Optical Carrier (OC) signal;
5 extracting the data based on the DS-3 standard from the payload of the SONET
6 frames;
7 storing the data in a synchronous first-in-first-out register array (FIFO) having a
8 first storage area;
9 transferring the data from the synchronous FIFO to an asynchronous FIFO
10 having a second storage area, wherein the first storage area is larger than the second
11 storage area; and
12 outputting the data based from the asynchronous FIFO at a DS-3 data rate on a
13 T3 signal.

1 23. The method of claim 22, wherein the OC signal includes an OC-48 signal.

1 24. The method of claim 22, wherein the OC signal includes an OC-3 signal.

1 25. A line card on a network element comprising:

2 a synchronous first-in-first-out register array (FIFO) having a first storage area
3 and coupled to receive data based on a Data Signal (DS)-3 standard from a payload of
4 Synchronous Optical Network (SONET) frames, wherein the SONET frames are being
5 transmitted on an Optical Carrier (OC) signal;

6 an asynchronous FIFO having a second storage area and coupled to the
7 synchronous FIFO, wherein the first storage area is larger than the second storage area;
8 and

9 control circuitry coupled to the synchronous FIFO and the asynchronous FIFO,
10 wherein the control circuitry is to transfer the data from the synchronous FIFO to the
11 asynchronous FIFO when the second storage area is not full and wherein the control
12 circuitry is to output the data from the asynchronous FIFO at a DS-3 data rate on a T3
13 signal.

1 26. The line card of claim 25, wherein the OC signal includes an OC-48 signal.

1 27. The line card of claim 25, wherein the OC signal includes an OC-3 signal.

1 28. A machine-readable medium that provides instructions, which when executed
2 by a machine, cause the machine to perform operations comprising:

3 storing data of a first data transfer rate in a synchronous storage device having a
4 first storage area;

5 transmitting the data of the first data transfer rate to an asynchronous storage
6 device;

7 storing the data of the first data transfer rate in the asynchronous storage device
8 having a second storage area, wherein the first storage area is larger than the second
9 storage area; and
10 outputting the data of the first data transfer rate from the asynchronous storage
11 device at a second data transfer rate.

1 29. The machine-readable medium of claim 28, wherein the synchronous storage
2 device is a synchronous first-in-first-out register array.

1 30. The machine-readable medium of claim 28, wherein the asynchronous storage
2 device is an asynchronous first-in-first-out register array.

1 31. The machine-readable medium of claim 28, wherein the first data transfer rate is
2 greater than the second data transfer rate.

1 32. A machine-readable medium that provides instructions, which when executed
2 by a machine, cause the machine to perform operations comprising:
3 receiving data at a first data transfer rate;
4 storing the data at the first data transfer rate in a synchronous storage device
5 having a first storage area;
6 processing the data at the first data transfer rate stored in the synchronous
7 storage device, wherein the processing includes:
8 removing the data from the synchronous storage device;
9 storing the data at the first data transfer rate in an asynchronous storage
10 device having a second storage area;
11 transmitting the data out from the asynchronous storage device at a
12 second data transfer rate, wherein the first storage area of the first storage device is
13 larger than the second storage area of the asynchronous storage device.

1 33. The machine-readable medium of claim 32, wherein the data of the first data
2 transfer rate is included in a signal using the Synchronous Optical Network (SONET)
3 standard.

1 34. The machine-readable medium of claim 32, wherein the data at the second data
2 transfer rate is included in a signal using the Data Signal (DS)-3 standard.

1 35. The machine-readable medium of claim 32, wherein the synchronous storage
2 device includes a synchronous first-in-first-out register array.

1 36. The machine-readable medium of claim 32, wherein the asynchronous storage
2 device includes a asynchronous first-in-first-out register array.

1 37. The machine-readable medium of claim 32, wherein the first data transfer rate is
2 faster than the second data transfer rate.

38. A machine-readable medium that provides instructions, which when executed by a machine, cause the machine to perform operations comprising:

- receiving data based on a Data Signal (DS)-3 standard from a payload of Synchronous Optical Network (SONET) frames, wherein the SONET frames are being transmitted on an Optical Carrier (OC) signal;
- extracting the data based on the DS-3 standard from the payload of the SONET frames;
- storing the data in a synchronous first-in-first-out register array (FIFO) having a first storage area;
- transferring the data from the synchronous FIFO to an asynchronous FIFO having a second storage area, wherein the first storage area is larger than the second storage area; and

13 outputting the data based from the asynchronous FIFO at a DS-3 data rate on a
14 T3 signal.

1 39. The machine-readable medium of claim 38, wherein the OC signal includes an
2 OC-48 signal.

1 40. The machine-readable medium of claim 38, wherein the OC signal includes an
2 OC-3 signal.

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